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ABSTRACT

The Gross Motor Performance Screening Test was designed to aid the classroom teacher in obtaining specific information about the child's physical abilities. The test includes items which have been found to measure the various factors of physical fitness. It also includes items to measure skills important to the child and adult. Included also are items to measure the relative performance of different areas of the body, i.e., legs as compared to trunk and arms. From the results of the tests, it is possible to prepare a profile which shows the areas of strength and weakness in terms of physical performance. The Gross Motor Performance Screening Test is suggested as a rather comprehensive screening test of important physical abilities of elementary school children. Detailed descriptions of the exercises and equipment involved, as well as suggested remedial activities, are included. (See TM 001 363 for summary report of the project; for other related documents, see TM 001 364-374.) (Author/DG)

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INTENSIFICATION of the LEARNING PROCESS

A SERIES OF REPORTS
DESIGNED FOR CLASSROOM USE

REPORT NO. 3

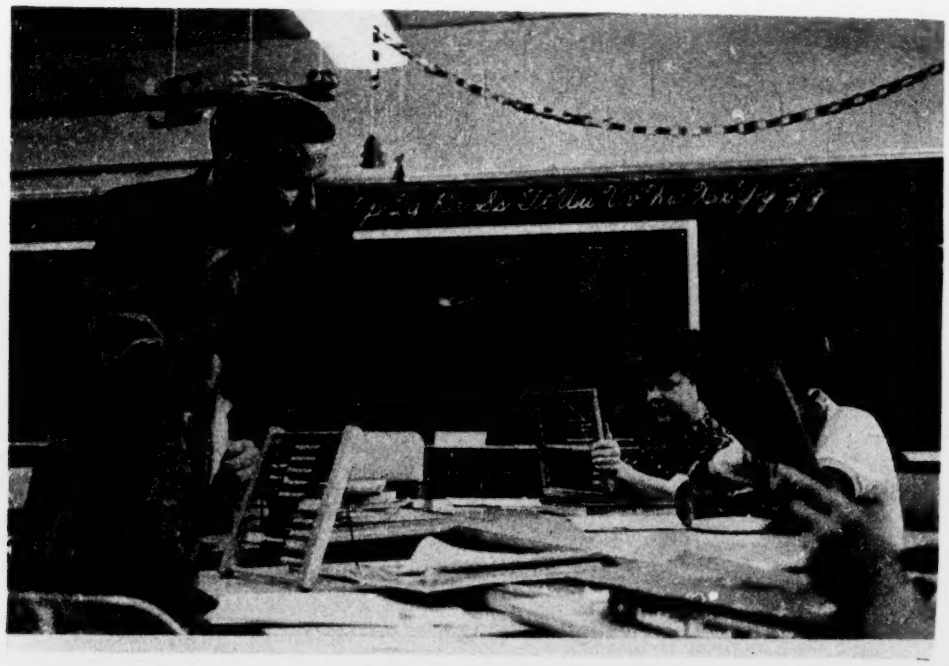
GROSS MOTOR PERFORMANCE SCALE

AN ESEA TITLE III PROJECT

BUCKS COUNTY PUBLIC SCHOOLS
DIVISION OF CURRICULUM AND INSTRUCTION SERVICES

FEBRUARY, 1970

PERSONALIZING EDUCATIONAL PRESCRIPTIONS



AN ESEA TITLE III PROJECT
PRODUCED BY
BUCKS COUNTY PUBLIC SCHOOLS
COUNTY ADMINISTRATION BUILDING
DOYLESTOWN, PENNSYLVANIA 18901

PREFACE

Traditionally the Bucks County Schools have been in the forefront of promising educational practices. Therefore, it came as no surprise that the PEP Program was funded by the Federal Government; it was equally reassuring that the NATION'S SCHOOLS identified Bucks County's "Intensification of the Learning Process" as one of the twelve most innovative proposals in the Country.

While this Program may have used a new approach, educators the World over have been giving lip-service for years to the need for personalizing education. In a day and age when we are surrounded by mechanized inventions of all sorts, it becomes even more important for us to preserve the human element related to the teaching-learning process.

The primary goal of the PEP Program is the development of educational prescriptions--prescriptions which are the result of bringing diagnostic services and multi-media services into harmonious relationship as they focus on the individual needs of youth. The success of the venture is tied to our most important educational product--the child himself. With this focus we believe administrative and other supportive services can aid the teacher so that she can directly fit the educational diet to the needs of individual students.

Dr. George E. Raab
Superintendent
Bucks County Public Schools

REQUESTING THE REPORTS

The following reports reflect the views, principles, processes and products used in the dissemination of information about the Bucks County Project for the Intensification of the Learning Process. These reports may be used as a framework for schools developing personalized educational prescriptions for its primary elementary children.

There are ten individual reports. Rather than combine all into one, it was decided to disseminate individual reports. In this way, persons interested in any one individual report may request and receive it without going through a larger document.

Each report is described below by report number, title, and content summary:

Report No. 1	Project Description	
	Describes the project goals, objectives, and team involved. Explains briefly the PEP approach to learning diagnosis and use of multi-level stimuli. Also includes a final summary report as well as changes in retrospect.	
Report No. 2	Research Findings	
	Part A	Design to Measure the Effectiveness of Personalized Educational Prescriptions in a Pilot Second Grade Classroom
	Part B	Design to Measure the Effectiveness of Personalized Educational Prescriptions in the Second Year of a Pilot Study
	Part C	Analysis of Pre-Test and Post-Test Data

Report No. 2 cont'd.	Part I	An Analysis of Data
	Part II	Homogeneity/Heterogeneity of Group Variances on Pre and Post Tests
Report No. 3	Gross Motor Performance Scale	
		Introduction Test Administration Reliability of Test Items Interpretation of Test Scores Suggested Circuits for Improving Performance in Tested Areas Physical Education Curriculum Guide
Report No. 4	Diagnostic Instruments	
		Learner State Check List Behavioral Objectives Evaluation Response Form
Report No. 5	Pupil Description Worksheet	
		Introduction User's Manual The Worksheet Response Sheet Class Pupil Profile Grade 2 Class Pupil Profile Grade 3 Initial Personalized Educational Prescription Data Collection and Processing
Report No. 6	Educational Grouping Questionnaire	
		A Classification of Children of Elementary School Age EGQ Manual EGQ Instrument Reports Provided by Computer Programs for the EGQ System Psychological Categories Sample Print-Out Recommendations for Future Development

Report No. 7	Diagnostic Instruments
	Visual Performance Screening Test
	Observing the Learner
	Questionnaire - Parent
Report No. 8	Automated Instructional Resources Retrieval System
	How to Use the AIRRS Thesaurus
	The Thesaurus
Report No. 8a	AIRRS Supplement
	Preface
	Why a Thesaurus
	Format of Document Record
	Present Status
Report No. 9	Curriculum Resources Center
Report No. 10	Prototype Curriculum Guides
	Mathematics
	Language Arts
	Science
	Social Studies

Each of the above reports are products related to the two objectives of the Intensification of the Learning Process, better known as Personalizing Educational Prescriptions (PEP) project.

1. The improvement of the diagnostic process with primary emphasis on the development of personalized educational prescriptions for all pupils.
2. The improvement and expansion of multi-media services for all pupils.

Bucks County Public Schools

Project for the

I N T E N S I F I C A T I O N O F T H E L E A R N I N G P R O C E S S

Report No. 3

Gross Motor Performance Screening
Test and User's Manual

ACKNOWLEDGEMENT

The work presented or reported herein was performed pursuant to a Grant from the U. S. Office of Education, Department of Health, Education, and Welfare. However, the opinions expressed herein do not necessarily reflect the position or policy of the U. S. Office of Education, and no official endorsement by the U. S. Office of Education should be inferred.

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Introduction

This manual is designed to provide a description of a physical performance screening test, procedures for drawing meaningful information from test scores, and an identification of activities which can be used to improve physical performance for each area tested.

The use of material in this manual will result in individualized physical activity programs which are based on objective information and which should improve the child's performance with a minimum of wasted time. The test battery should be administered at least three times per year. The fall test administration scores would be used as the basis for planning the type and quantity of activities for each child during the first one half year. The mid-year test scores would be used to evaluate the effectiveness of the program and to adjust for possible changes in the child's abilities which would require a change in time spent on each activity area. The third test administration should be in the spring near the end of the school year. The results of the spring testing should be used to evaluate the effectiveness of the entire activity program.

Knowledge of a child's level of ability in the various factors and skills of physical performance is important to the teacher in planning a program of physical activity which will best benefit the child. When the knowledge has been gained by objective techniques it is more precise and complete than when it is the result of opinion.

The Gross Motor Performance Screening Test was designed to aid the teacher in obtaining objective information about the child's physical abilities. The test includes items which have been found to measure the various factors of physical fitness. It also includes items to measure skills important to the

child and adult. Included also are items to measure the relative performance of different areas of the body, i.e. legs as compared to trunk and arms.

From the results of the test it is possible to prepare a profile which shows the areas of strength and weakness in terms of physical performance. Application of remedial action to the weak areas and maintenance of the strong areas should result in higher total physical performance than could be attained through a program which does not consider the individual differences of children. Non-individualized programs waste time on activities which some children do not need. This, while other children do not get enough participation in a needed activity. It is not possible to individualize instruction without using some evaluative technique. The Gross Motor Performance Screening Test is suggested as a rather comprehensive screening test of important physical abilities of elementary school children.

Each item in the test battery was selected to measure one of the factors of physical performance which have been identified through research studies utilizing factor analysis. An understanding of the factor which a test item is purported to measure is important in interpreting the real meaning of high or low performance on a test item. Additionally, planning the physical activity program for the child is dependent upon an understanding of the factors measured by the test item as well as on knowledge of the relative contribution the activities of the program make to the development of the various factors.

Table 1 includes the factors and the test items which were selected. It is to be noted that for certain of the factors more than one test item was selected. This choice reflects the desire to measure the performance of each

area of the body for those factors which cannot be tested by one item and which have been judged particularly significant in the effectiveness with which a child deals with his physical environment.

TABLE 1. FACTORS AND TEST ITEMS IN THE SCREENING TEST

Factor	Factor Description	Test Item
Agility	Rapidly changing direction of bodily movement.	Zig Zag Run
Balance	Ability to maintain body equilibrium	Tapered Balance Beam
Circulorespiratory Endurance	Ability to continue activity which places stress on the circulatory and respiratory systems.	Three Hundred Yard Run
Coordination	Performance of a skill in an efficient manner, with a minimum of superfluous movement.	Ball Throw Throw and Catch Ball Kick
Explosive Strength (Power)	Maximum physical exertion of short duration	Shot Put Standing Broad Jump
Flexibility	Range of motion possible at various body joints	Flex Test
Muscular Strength and Endurance	Ability to continue activities which require moderate levels of strength	Flexed Arm Hang Curl Up Squat Jump
Speed	Rapid body movement	Thirty-Yard Dash

Personal data which are recorded include name, birth date, school, grade, age, height, and weight.

The recommended order of administration for the test items is as follows:

First Day	Second Day
1. Standing Broad Jump	1. Tapered Balance Beam
2. Shot Put	2. Flex Test
3. Thirty-Yard Dash	3. Zig Zag Run
4. Flexed Arm Hang	4. Ball Throw
5. Curl Up	5. Throw and Catch
6. Squat Jump*	6. Ball Kick
	7. Three Hundred Yard Run*

Age should be recorded in years and months to the last completed month, i.e. 12 years 10 months. Weight should be recorded to the nearest half pound with the subject in gymnasium uniform or equivalent. Height is to be recorded to the nearest half inch (stocking feet).

1. FLEXED ARM HANG:

   Purpose; to measure muscular strength and endurance of the arm and shoulder girdle muscles.

   Equipment: horizontal bar, stop watch, chair

   Direction: The subject stands on a chair and grasps a horizontal bar in a flexed arm position with the palms toward him grip and with his chin above the bar. On the signal (Ready? Go!) the chair is removed and the watch started. The subjects score is the number of seconds he can keep his arms flexed more than ninety degrees.

2. CURL UP (max 50.):

   Purpose; to measure muscular strength and endurance of the trunk flexors.

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*These items should always be the last items administered on the respective testing day and should never be given on the same day.

Equipment: mat

Direction: The subject begins in the supine position with his knees flexed and his hands behind his head (fingers do not need to be interlocked). The tester holds the ankles of the subject to keep the subject's soles in contact with the mat. The subject must sit up to the vertical position on each curl up. The number of curl ups completed without resting or bringing the hands away from the head is the subject's score. Any subject who completes 50 curl ups is stopped at that time and given the maximum score which is 50.

3. SQUAT JUMP:

Purpose; to measure muscular strength and endurance of the trunk and leg extensors.

Equipment: mat

Direction: The subject begins from a crouched position with his arms on the outside of his knees and his hands touching the mat. The subject jumps into the air to an approximate height of four inches as he extends his legs and trunk. When landing from a jump the subject continues into the crouched position for the next jump. The score is the number of correct jumps the subject can perform without stopping.

4. SHOT PUT:

Purpose; to measure explosive power of the upper body.

Equipment: four pound shot, fifty foot steel tape

Direction: The subject begins with the four pound shot held in one hand with the arm flexed and with both feet behind the restraining line. He then puts the shot as far as he can. He is encouraged to rotate

his upper body as he throws. Measurement is taken in inches and measures from where the shot first touches the ground back to the back of the restraining line. The subject's score is the best of two trials.

5. STANDING BROAD JUMP:

Purpose; to measure the explosive power of the legs.

Equipment: Mat

Direction: The subject begins with the toes of both feet directly behind the restraining line, and with his body in a crouched position with both arms extended backward. He then swings his arms forward as he jumps forward as far as possible. Both feet must leave the mat simultaneously. Measurement is taken in inches from the back of the starting line to the point on the mat which is contacted by the body part which is nearest to the restraining line and in contact with the mat after the subject lands. The best of two jumps is recorded as the subject's score.

6. FLEXIBILITY TEST:

Purpose; to measure general flexibility of the hip joint and the spine.

Equipment: Flex tester

Direction: The subject sits on the floor with his legs extended and the soles of his feet against the foot board of the Flex Tester. He grasps the handle bar of the Flex Tester and reclines into the supine position with his arms extended toward his feet. (Note: This move automatically sets the starting position of the marker in relationship to the sliding caliper.) On the signal (Sit Up. Keep your knees

straight and push the handle bar as far as you can before you release it.) The subject follows the directions and pushes the handle bar as far through the marker eye screw as possible. The number of inches the subject has pushed the sliding caliper through the marker eye screw is read directly off of the sliding caliper and recorded to the nearest one half inch as the subject's score.

7. TAPERED BALANCE BEAM:

Purpose; to measure balance and coordination.

Equipment: tapered balance beam

Direction: The subject begins standing on the wide end of the beam with one foot directly ahead of the other and with the heel of the front foot in contact with the toes of the rear foot. The subject is to walk forward along the tapered balance beam as far as possible by placing the heel of the foot which is taking the step against the toes of the supporting foot on each step. Both feet must be pointing straight along the beam and cannot be toed in or out. The last inch of the beam which the subject is able to place his foot on becomes his score, i.e. the greatest beam distance traveled in either of two trials before he falls from the beam is recorded as the subject's score. The subject may be assisted onto the beam, but no further. Tennis shoes or sneakers are worn by the subject.

8. THIRTY YARD DASH:

Purpose; to measure speed.

Equipment: stop watch, starting and finish line markers.

Direction: When the starting signal (Ready? Go!) is given the subject should sprint from the starting line to the finish line. The number of seconds the subject takes to run the thirty yards is recorded to the nearest tenth of a second. The timer stands at the finish line and starts the stop watch on the starting movement of the subject rather than any movement or sound of the starter.

9. THREE HUNDRED YARD RUN:

Purpose; to measure circulorespiratory endurance.

Equipment: stop watch, four course markers.

Direction: Markers are used to outline a square one hundred yard course which the subject runs for three laps. When the starting signal (Ready? Go@) is given the subject is to run the course as fast as he can and the number of seconds elapsed before he crosses the finish line is recorded to the nearest tenth of a second.

10. BALL THROW:

Purpose; to measure coordination and throwing skill.

Equipment: twelve inch softball, throwing area marked at ten yard intervals, steel measuring tape.

Direction: The subject must use a running approach to the restraining line to throw the 12-inch soft ball as far as possible. The approach may be of any length and the subject may use any one handed throwing motion he chooses. Measurement is from where the ball first hits the ground to the restraining line. The score is taken from the best of two throws and is recorded to the nearest half foot.

11. THROW AND CATCH:

Purpose; to measure coordination and catching skill.

Equipment: eight and one half inch utility ball, wall target, floor markings

Direction: Five 2-foot squares are marked on the floor. The first square is three feet from the wal l and the other four are behind each other at a distance of one foot each. A target is marked on a flat wall surface with half inch tape. The target is three feet square and the bottom is four feet from the floor. The center area of the target is an inner square ten inches from each of the sides. The subject begins with both feet inside of the first floor square and throws the 8½ inch utility ball against the target with an underhand motion and attempts to catch it in the air on the rebound while keeping both feet inside the square. He is given two practice trials from the first square followed by three scored trials from each of the five squares. Each throw is scored two for hitting in or on the center targe square and two for a successful catch with both feet in the floor square. One point is awarded for throwing the ball in or on the outer wall square and one point is also awarded for catching the ball in the air after stepping outside of the floor square. If the subject steps out of the floor square when throwing the ball he is given a retrial. The subject's score is the sum of points from the fifteen throws.

12. BALL KICK:

Purpose; to measure coordination and kicking skill.

Equipment: soccer ball, wall target, floor markings.

Direction: A five foot high and ten foot wide target is marked on a flat wall surface with half inch tape. The target area is marked into three rectangles with the second rectangle three feet high and six feet wide. The center rectangle is one foot high and two feet wide. The five is marked in the small target area, a three in the middle area, and a one in the largest area. There are three lines placed on the floor. Each floor line is three feet long and parallel to the wall target. The first floor line is ten feet from the wall, the second is twenty feet, and the third is thirty feet from the wall target. A soccer ball is placed on the first (10 foot distance) floor line and the subject attempts to kick the ball into the smallest target area. The subject is given two practice kicks and three scored kicks from each of the three floor lines. Each trial is scored according to the number of the target area in which it hits. The higher value is awarded when the ball hits on a line. The subject's score is the sum of the nine kicks.

13. ZIG ZAG RUN

Purpose; to measure coordination, agility and speed.

Equipment: stop watch, four folding chairs

Direction: A six inch X is placed on a wall four feet from the floor. A folding chair is placed on the floor six feet from the wall. A second chair is placed six feet behind the first chair, a third chair six feet behind the second, and a fourth six feet behind the third chair. The subject stands behind the starting line and on the signal (Ready? Go!) he runs on the right side of the nearest chair, to the left of the

next chair, to the right of the following chair, to the left of the last chair, touches the X on the wall and returns through the chairs in the same zig zag manner. The subject's score is the time it requires him to run the course and return across the starting line. The time is recorded to the nearest tenth of a second. He is given two trials and the best time is recorded.

Reliability of Gross Motor Performance

Screening Test Items

Test retest reliability was investigated by Robert Von Drach[1] utilizing 100 children. The conditions under which reliability was investigated and suggestions for improving reliability are reported in the Von Drach reference.

TABLE 2. TEST RE-TEST RELIABILITY FOR GROSS MOTOR PERFORMANCE

SCREENING TEST	
Standing Broad Jump	.842
Shot Put	.828
Thirty-Yard Dash	.577
Three Hundred Yard Dash	.702
Flexed Arm Hang	.809
Curl Up	.889
Squat Jump	.837
Tapered Balance Beam	.530
Flexibility Test	.908
Zig Zag Run	.266
Ball Throw	.934
Ball Throw and Catch	.742
Ball Kick	.532

[1]Robert Von Drach. Personal communication with Robert Von Drach, Bucks County Public Schools, Bucks County Administration Building, Doylestown, Pennsylvania, 1969.

Interpretation of Test Scores

To facilitate the analysis of a child's comparative performance in the different factors Hull Scale Norms have been prepared. The norms are based on tests which were administered to 1004 second grade children at the Centennial Joint Schools of Bucks County, Pennsylvania. The norms may be found in Appendix G.

The use of norms allows a comparison between a student's scores and those scores obtained by a group of students as well as enabling a comparison of the student's performance on one test item to his performance on the other tests. In this manner, areas of strength and areas of weakness can be identified. To make comparison between performance on different test items, it is necessary to convert raw test scores to some type of common or normative score, i.e. it is not possible to directly compare the seconds that are required to complete the 300 yard run to the number of inches the student can score on the tapered balance beam.

The type of normative scale selected for use with the Gross Motor Performance Screening Test was the Hull Scale. The Hull Scale is a commonly used normative procedure and is described in detail in most statistical references. The scale is continuous from 0 through 100. It is based on the mean and standard deviation obtained from a single set of data for each test item. The mean of the raw data is set as being equal to 50 on the Hull Scale. Each unit (one point) on the Hull Scale is equal to seven hundredths (.07) of the raw score standard deviation.

Converting a student's test score to his Hull score is accomplished by referring to the Hull scale (Appendix G) for the test item score being converted,

reading down the test item raw score column until the student's score is found, then reading the Hull score which is in the left column of the page directly across the page and in line with the student's raw score. For example: A student with a raw score of 200 inches in the shot put test item would have a Hull score of 95 for the shot put. In this manner each raw score should be converted to a Hull score and recorded on the student's score card (Appendix A).

A Hull score of 50 means the student is of average performance in that area as compared to the normative population. Correspondingly, Hull scores above 50 indicate above average performance and scores below 50 indicate below average performance and scores below 50 indicate below average performance compared to the normative population.

When planning an activity program for a child it is more important to compare his relative performance in the different areas of the test rather than how he performed in relation to the norms. His program should be planned to include more activities to strengthen those areas in which he is weakest and proportionately less time should be planned for areas in which he is more capable. This proportionate allotment of time can be accomplished most efficiently if an objective routine procedure is used. The following procedure, while at first appearing complicated, is easy to use and is efficient.

To determine prescription time for each factor (or test item): (1) find prescription time multiplier by dividing total exercising time (T.E.T.-total class time, in seconds, being devoted to the individualized prescription program) by total Hull points below 100 (drop all decimals in the multiplier); (2) multiply deviation Hull points for each factor by the prescription time multiplier; and add the adjustment time to the lowest factor's time; (3) total prescription time

in seconds; and (4) convert times to minutes and seconds.

Total Deviation Points Below 100: For each test item the child's score on that item is substracted from 100 to yield his deviation points for that test item. The deviation points from each of the test items are added to yield the Total Deviation Points Below 100.

Total Exercising Time (T.E.T.): Convert the single class period time being used for the individualized prescription program time into seconds to yield total Exercising Time.

Prescription Time Multiplier: Divide Total Exercising Time by Total Deviation Points Below 100 to yield the Prescription Time Multiplier. Drop the numbers to the right of the decimal so further computation is made in whole seconds.

Adjustment Time: Calculation of the time to spend on each exercise area will result in a few seconds of class time remaining unaccounted for (due to dropping of numbers to right of decimal). This excess time is referred to as Adjustment Time and is added to the exercise time as calculated for the test item on which the child achieved the lowest score.

Prescription time for an exercise area is found by multiplying the deviation points for that test area by the prescription time multiplier. The only prescription time which receives additional time is the area represented by the child's lowest test score. This area receives the adjustment time in addition to its calculated prescription time.

When prescription times have been calculated for each test item the teacher may follow one of two plans for activity. Activity plan one includes

one activity or exercise for each test item. Although the activity or exercise would be changed periodically to avoid boredom, this plan deals with the test items and the resulting exercise program on an individual test item basis. Activity plan two is based on a consideration that the various test items represent factors of physical performance and that more than one item is used to measure many of the factors (Note Table 1). Therefore, it is possible to select activities and exercises which help to develop the performance in the factors rather than in specific test items. If this plan is chosen Table 1 is used to identify the factor represented by the test item, exercises are selected which are purported to develop performance in the identified factor, and the time allotted to the test items for the idetnified factor are combined to form the prescription time for the factor. Although plan two requires additional time on the part of the teacher it will yield a more meaningful understanding of the child and will result in a more efficient program.

If norms are being calculated and programs are being individually prescribed (time on an activity individuall varied according to the child's test scores) for a large number of children it is desirable to use a computer. With proper computer program changes it is possible to receive a print out from the computer which indicates the number of seconds a child should spend in each developmental activity, based on his Hull scale scores as also calculated by the computer. The information which must be given to the computer includes the mean and standard deviation from the Hull Scale Norms and the child's raw score on each test item.

A computer program which may be used to yield the results described is included as Appendix H. The program assumes a class period of 30 minutes and assigns proportionately more time to the test areas in which the child exhibited poor performance.

A teacher does not need to have access to a computer to analyze test results for either the computer prodedure or the printed norm procedure may be used for analysis and individual activity programming. There would be no reason to use both for they accomplish the same purpose.

Activities to Improve Performance in Factors Measured by the Screening Test[2]

The activities described below under the section for each physical performance factor are only suggestions. Many other activities may be found in books describing activities for physical education classes. Many of the activities contribute also to the development of performance in factors other than the one under which they are listed. This is particularly true for the game activities. Games such as Dodge Ball can contribute to such factors as circulorespiratory endurance and coordination as well as the factor of agility under which it is listed. These additional benefits will be derived if the teacher is ingenious enough to ensure vigorous participation for all students for the entire class period.

Vigorous and continuous participation can be most easily attained if the teacher, in most instances, organizes the individually prescribed activities into stations as parts of a circuit. The students should move from one activity station to another until they have participated their individually prescribed quantity of time or performance at each station. The teacher must plan the layout of the circuit and the quantity of equipment at each station so no student needs to wait to perform.

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[2]Many of the activities described in this section were tested and descriptions provided by Janet Linsenmaier, Bucks County Public Schools, Bucks County Administration Building, Doylestown, Pennsylvania, 1969.

Activities to Improve Agility

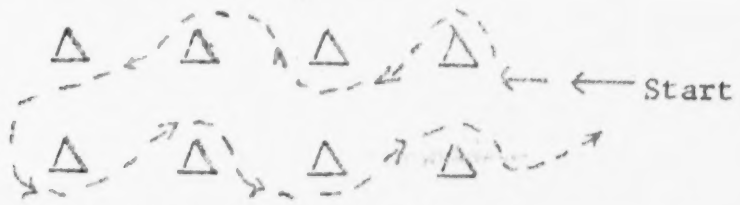
(Measured primarily by the test item Zig Zag Run)

1. Maze Run

   A. Space Needed - 18 by 12 feet

   B. Equipment - Eight cone-shaped rubber markers

   C. Procedure - Place four markers in a straight line, each one four feet apart. Then place four more markers parallel to them, six feet apart.



Start children at intervals (spacing them about two markers apart). They run in a zig zag fashion down the first four markers and then return to the starting line by zig zagging up the other four markers. This is a continuous motion with no waiting or resting.

2. Boiler Burst

   A. Space Needed - gymnasium or playground

   B. Equipment - none

   C. Procedure

      1) Formation - have one child sit in the center of a small circle. All of them are sitting facing the center. No one sits in back of anyone.

      2) How to play Boiler Burst

         (a) This is a story-telling and running game. The child in the center is the story teller. Usually the teacher plays this role the first time to give them the idea of fooling the class.

(b) When the child is in the middle of his tale and when he thinks they least expect it, he says or yells, "Boiler Burst."

(c) Everyone gets up and runs to either end of the gym to a "safe" place. (Wall, line, etc.) The story teller gets up as soon as he yells "Boiler Burst" and tries to catch or tag one of the fleeing children.

(d) The one caught becomes the new story teller. If the person caught has had a turn in the center, they will pick someone who has not.

(e) The game is over when all have had a turn.

3. Dodge Ball

A. Space needed - gymnasium or playground

B. Equipment - playground ball (8½ inch diameter)

C. Procedure

(1) Formation - circle formation - children spaced evenly around large circle.

(2) How to play Dodge Ball

(a) This game has many variations. It can be played with more than one ball, etc.

(b) This simple version is played by selecting six children to go into the center.

(c) They must try to avoid or dodge the ball so that it does not hit them.

(d) The circle players try to hit them. They must hit below the waist and stay on the circle line when they throw it.

(e) When a child in the center is hit by the ball, the circle player who hit him goes into the center and the hit player goes to the circle.

(f) When a player or group of players are in the circle too long, have them choose others.

(g) Other versions for second grade.

- Divide the circle into two teams by counting off by two's
- Have all of the "ones" go in the center and all of the "two's" on the circle.
- Allow a certain time, such as four minutes, and they change teams. Count the number of players each team managed to hit out of the circle.
- When you are hit, you leave the circle and sit down, out of play.

4. Zig Zag Indian Club Relay

A. Space Needed - gymnasium

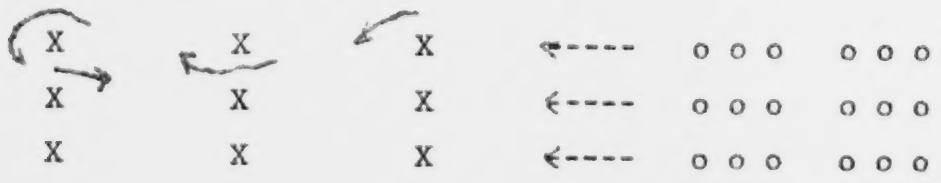
B. Equipment - three Indian clubs for each relay team

C. Procedure

(1) Formation

(a) Divide the class into equal teams, one player in back of the other.

(b) Place the Indian Clubs (3 to a line) in a line with each team but spaced apart.



(2) How to play

(a) At the teacher's command, the first runner in each line will run forward, weaving in and out of the first two clubs and completely running around the third one.

(b) To return, he will again weave in and out the clubs and touch the waiting players out-stretched right arm. The arm is stretched sidewards not forward.

(c) When touched, the new runner runs forward and repeats.

(d) Winner is determined by whose last runner crosses the finish line first.

(3) Variations

(a) Runner jumps over the first two clubs and runs around the third. He does the same going back.

(b) Runner zig zags or jumps over the first two and picks up the third. He hands it to the next runner who runs up zig zagging or jumping over the first two and replaces the club. He returns by the same way he ran up and touches the next runner. They alternate picking up and replacing the third club.

Activities to Improve Balance

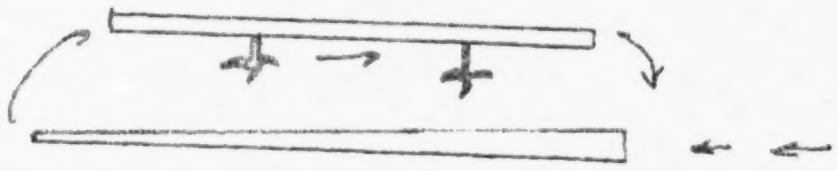
(Measured primarily by the test item Tapered Balance Beam)

1. Heel-Toe Balance Beam Walk

A. Equipment - One tapered balance beam with the inches printed on the sides - starting at the wide end. One high balance beam at its lowest height; this beam is four inches wide, and 12 feet long (Elementary school size). Mats.

B. Space Needed - 16 by 12 feet.

C. Procedures - Place the beams parallel to each other, using mats under the high beam.



Start children at the wide end of the tapered beam. They walk as far as they are able on the beam by placing the heel of one foot close to and touching the toe of the other foot. When they leave the tapered beam, they climb on the high beam and walk in the same heel to toe fashion across the length of the beam. The movement of children should be as continuous as possible, so that there is little or no waiting.

2. Headstand

A. Space Needed - 15 by 15 feet.

B. Equipment - mat

C. Procedure

(1) Kneeling position on mat. Place hands and head in a triangular position. Head is in front of hands.

(2) Head is placed on hairline.

(3) Shift weight forward so that hips are over the shoulders.

(4) Keep hands in place. When you feel balance, raise legs up over head and allow hands and head to bear the weight.

(5) Roll out or go down the way you came up. A roll out must be learned for safety.

(6) A tip-up may be used, place knees on elbows to achieve balance and then raise legs.

D. Variations

(1) Straight leg headstand

3. Balance Beam

A. Space Needed - 20 by 10 feet.

B. Equipment

(1) Elementary size 12 foot long beam 4 inches wide.

(2) Beam should be adjustable so that it can be lowered for small children (waist high).

(3) Always use mats under beam and have spotting.

C. Basic Movements

(1) Movements that are performed on the beam may be practiced on the gym floor and taught at one time to the whole class. They should follow a line on the floor.

(2) When they move from this line, "oops", they have fallen off the beam.

(3) Good posture on the beam is very important for looks and balance.

(4) Keep all of foot on beam.

(5) Head tall.

D. Activities

(1) Walking

(a) Stand at one end of beam facing the other end, body weight balanced over right leg, left leg extended rearward, toe pointed, arms sideways.

(b) Move left leg forward with leg straight and toe pointed.

(c) Place left toes on beam, and roll down onto foot, transferring body weight over left leg. Repeat.

(2) Turning

(a) Toe Turn

- Stand on beam with right foot in front, arms sideways.
- Rise on toes, turning body 1/2 turn to the left. When balance is good, raise arms upward as turn is made.
- Stretch body tall, don't bend at waistline. Keep spine rigid.

(b) Squat turn

- start from a stand with right foot in front of left, arms sideways.
- bend both knees, lowering to a squat position with body weight over left leg.
- while in squat position, make 1/2 turn to left. (Transfer body weight over right leg after 1/4 turn has been completed.)
- rise to stand. Do not bend at waistline, as it causes an off-balance.

(3) Scale

(a) Stand on beam (or line on floor) with arms upward. Body weight is balanced over left leg. Right leg is extended rearward, toe pointed and on beam. Both legs are straight.

(b) Raise right leg rear and upward. Arch back.

(c) Keep back arched and continue to raise leg rear-upward as upper body lowers to scale position. Keep left ankle rigid.

(d) When off-balance, place hands on beam and drop to floor on feet.

4. Balance Beam Mounts and Dismounts

A. Space Needed - 20 by 10 feet

B. Equipment

(1) Elementary size 12 foot long beam 4 inch wide

(2) Beam should be adjusted so that it can be lowered for small children (waist high)

(3) always use mats under beam and have spotting.

C. Procedure

(1) Support Mount

(a) stand facing side of beam. Spring both legs, directing body diagonally forwards straightening arms. Rest body against side of beam, arch back, legs straight and together. Toes pointed.

(b) Raise right leg side upwards shifting body weight over right arm

(c) Pass right leg over beam pivoting around right arm 1/4 to left and lower buttocks to beam. End in a straddle seat position.

(2) Simple bent-knee mount

(a) support mount and bend knees and stand on beam. Boys find this easy.

(3) Dismounts - at this age I teach the children to use a jump-off dismount.

(4) Spotters

(a) children should be taught they may work on the beam only when there are mats under it, and when the teacher is spotting them.

(b) A spotter's main thought is to prevent the upper body of the child from descending until the child has a chance to get her

feet under her.

(c) Most spotting is done by gripping the upper arm.

(d) A spotter must never grasp for the feet of the child when she is losing her balance.

(e) With some skills, more than one spotter may be necessary.

Activities to Improve Circulorespiratory Endurance
(Measured primarily by the test item, Tapered Balance Beam)

1. Endurance Run

   A. Equipment - four cone shaped markers

   B. Space Needed - 30 by 12 feet

   C. Procedure - Place the four markers as in diagram. They are to mark the corners of the running area so that the children will stay in their area and will run the correct course.

Start the children running spaced evenly apart. They are to run in a steady, jogging fashion. They run around the markers and they may pass one another. They are to run as many laps as they can in the time alloted to them, and they are to count their laps. This is to measure their own improvement.

2. Skipping Rope

   A. Space Needed - 15 by 15 feet

   B. Equipment

      (1) Have several lengths of rope for shorter and taller children. Mark them. (3/8 to 1/2 inch thickness)

(2) Each child should have his own rope. It should extend from armpit to armpit when he stands in the center of the rope.

C. Basic Movements

(1) Light hops or leaps

(2) Rope should be held loosely in fingers with thumbs placed on top of the rope and pointing to the side.

(3) Elbows are held close to side with forearms and hands pointing slightly forward and away from the body.

(4) Start turning the rope by swinging arms and shoulders in a circular motion.

(5) After the rope is in a circular motion, all further action should be made by wrists and fingers.

(6) Back should be straight.

(7) There are two jumps in place for each complete turn of the rope.

(8) Basic two foot step, start with rope behind feet. Pull rope around and jump over it. Take a second rebound jump as rope is passing backward and upward.

(9) One foot hop, stress ability to hop on left as well as right

D. Activities

(1) Jumping to a steady beat

(2) Jumping to music

(3) Jumping while moving

Activities to Improve Coordination
(Measured primarily by the test items Ball Throw, Throw and Catch, Ball Kick; and secondarily by the test item Tapered Balance Beam)

1. Ball Rebound

   A. Space Needed - 30 by 30 feet, to allow space for rebounding ball.

   B. Equipment - Eight and one-half inch utility ball and wall and floor markings.

   C. Procedure - A wall target is marked on a flat wall surface with half inch tape. The target is three feet square and the bottom of the target is four feet from the floor. The center area of the target is an inner square ten inches from each of the sides. Five-two foot squares are marked on the floor. The first square is three feet from the wall and the other four are behind each other at a distance of one foot each.

   The child begins with both feet inside of the first floor marking or square and throws the ball against the target with an underhand motion, and attempts to catch it in the air on the rebound while keeping both feet inside the square. The child tosses the ball twice from each square, beginning from the square closest to the target.

2. Soccer Target Kick

   A. Space Needed - Thirty by thirty feet

   B. Equipment - Soccer ball, wall target, floor markings

   C. Procedure - Using half inch tape, mark a five foot high and ten foot wide target on a flat wall. The target area is marked into three rectangles with the second rectangle three feet high and six feet wide. A 5 is marked in the middle area, and a 1 in the largest area. There

are two lines placed on the floor. Each line is three feet long, and parallel to the wall target. The first line is ten feet from the wall, and the second is twenty feet from the wall.

A soccer ball is placed on the first floor line (ten feet) and the child attempts to kick the ball into the smallest target area. Every child gets one kick from each line and then another child starts his turn. Children who are waiting for a turn help to retreive ball.

3. Forward Roll

   A. Space Needed - 20 by 15 feet

   B. Equipment - mats

   C. Activity

      (1) Begin in a squat position with hands on mat. Fingers pointed forward and hands outside of an in front of feet.

      (2) Tucking head under, push off from toes. Raising the seat and balancing on hands, go over until the back of the head and shoulders touch the mat.

      (3) Continue rolling forward until feet are flat on floor in starting position.

   D. Variations

      (1) continuous rolls

      (2) Straddle rolls

4. Backward Roll

   A. Space Needed - 20 by 15 feet

   B. Equipment - mats

C. Activity

(1) Begin with back toward the direction you intend to travel on the mat.

(2) Begin in a squat position as in the forward roll, only in reverse.

(3) Move backwards by pushing off with hands, keeping knees bent.

(4) Immediately reach back with hands and place them flat on mat next to the head.

(5) Using arms and shoulder strength, push with hands to give the head and neck plenty of room.

(6) Continue rolling over to land on toes. Neck should not be twisted.

D. Variations

(1) Straddle roll (backwards)

(2) Continuous backwards rolls.

5. Cartwheel

A. Space Needed - 30 by 15 feet

B. Equipment - mats

C. Activity

(1) Stand with either side toward the mat

(2) If you are executing a left handed cartwheel, the action would be: on the count of

(a) left hand on mat

(b) right hand on mat

(c) right foot on mat

(d) left foot on mat

(3) The cartwheel is done in a straight line with the legs straight and toes pointed.

(4) Hips are directly above shoulders when both hands are on mat.

(5) Legs are spread wide apart.

(6) Land in an upright position with legs strait and apart.

D. Variations - continuous cartwheels

6. Ball Bouncing

A. Space Needed - 15 by 15 feet

B. Equipment - one 8½ diameter playground ball for each child, if possible. If not, divide the class into groups, one ball for each group.

C. Basic Movements

(1) Push the ball toward the floor with fingertips. Do not slap the ball with the palm of your hand.

(2) Hold hand down below the waist and wait for ball to bounce up. Relax arms and wrist, push down again with fingertips.

(3) Keep eyes on ball

D. Activities

(1) Allow each child to practice handling the ball

(2) Set a pattern for the bouncing - to develop a keener rhythmic sense in each child

(a) bounce, catch, hold

(b) bounce, bounce, hold

(c) bounce, hold, hold

(3) Use music with strong accents and have them bounce on the accents.

(4) Combine bouncing with tossing

(5) Bouncing while walking, bounce ahead of feet

(6) Bounce to partner whom he is facing. Set patterns and use music.

(7) Bounce off wall and catch to a pattern.

(8) Have walking and running bouncing relays.

7. Kick Ball

A. Space Needed - gymnasium or playground

B. Equipment - one 8 1/2 inch diameter rubber playground ball

C. Basic Movements

(1) Keep eye on ball for kicking and catching

(2) Step forward to kick ball. Keep leg straight and rigid.

(3) Reach out to catch ball. Catch it with fingertips.

(4) Teach baseball throw and two hand throw.

(5) Teach the order of bases and responsibility of the players.

(6) Ball must be pitched in a roll toward the kicker.

D. Formation - same as softball

E. Activity

(1) Divide class into two teams and assign positions.

(2) Ball may not be thrown at runner in an attempt to get them "out"

(3) Kicker must stay in kicking order

(4) Runner may not leave base until ball has left the pitcher's hand

(5) Keep rules as similar to softball as possible.

8. Soccer Kick Relay

A. Space Needed - gymnasium or playground

B. Equipment - one soccer ball for each relay team

C. Basic skills

(1) Form relay lines

(2) Kick for distance

(3) Keep eye on ball, ball is stationary

(4) Instep kick, top of foot.

D. Activity

(1) The first person in each line may run forward to kick the soccer ball. All balls are on an even line

(2) On the command, "go", one child in each line runs forward and kicks the ball.

(3) The teacher and class helpers will judge which kicker has kicked the longest distance. His team will be awarded one point.

(4) Continue until every child has had a turn.

E. Variations

(1) Dribble Relay

(a) Same lines as preceding game

(b) Place marker opposite each team

(c) The dribbler moves forward dribbling the ball up to and around the marker and returns to his line where the next waiting child

d does the same.

(d) continue until all have had a turn

(e) a dribble is moving the ball with short pushes by either foot. Keep ball within 5 feet of player. Teach by having the child walk through it first. Use inside of feet.

9. Over-Under Ball Relay

A. Space Needed - gymnasium or playground

B. Equipment - 8/½ inch playground ball for each line

C. Formation

(1) Players line up in equal teams, one in back of the other, about

a step apart.

(2) all look forward

D. Activity

(1) First person in line is given the ball

(2) on the command "go", reaches up with both hands on the ball and without turning around, holds the ball high.

(3) The player behind him grasps the ball and, bending down, holds the ball between his legs.

(4) The player behind him grasps the ball from between his legs and raises his arms and the ball upward

(5) Thus the "over and under" movement

(6) When the ball reaches the last child in line, he runs forward to th the front of the line and immediately raises his arms and the ball above his head.

(7) The game is over when the original leader of the line receives the ball at the end of the line and runs forward to the head of the line.

10. Catching and Passing Relay

A. Space Needed - gymnasium or playground

B. Equipment - two 8½ inch diameter playground balls

C. Formation

(1) Each team consists of two equal lines facing each other

(2) The children are standing an equal distance apart

D. Basic Movements

(1) Catching

(a) Ball must be caught with two hands

(b) Keep eye on ball until it is caught

(c) arms go out to meet the ball, and then come back toward the body.

(d) catch ball with fingertips, not the palms of the hands.

(2) Throwing

(a) Chest pass

- hold ball chest high
- fingers spread around surface of ball
- thumbs close together
- take one step forward, shifting the weight and extend the arms forward in a pushing movement
- throw to chest area of catcher

E. Activity

(1) at the command "Go", the first player with the ball on each team will start the throwing and catching, zig zagging all the way down the two lines and back

(2) The team that returns the ball back to the starter first wins the game

(3) It is suggested this game be played after practicing the activity slowly.

11. Modified Newcomb

A. Space Needed - gymnasium or equipped playground

B. Equipment

(1) one volleyball net, slightly lower

(2) one volleyball

C. Formation

(1) A casual arrangement of spacing on either side of net

(2) no specific positions

D. Basic Movements

(1) jumping high to catch ball

(2) baseball type throw and two-hand pass

(3) catching the ball

E. Activity

(1) Game is started by one team whose player throws the ball over the net.

(2) The ball is then caught and thrown back across the net without touching the floor

(3) This continues until the ball is permitted to touch the floor on either side of the net.

(4) When this happens, a point is awarded to the team that threw the ball

(5) Game is over when 10 points are made by either team

Activities to Improve Explosive Strength
(Measured primarily by the test items Shot Put and Standing Broad Jump)

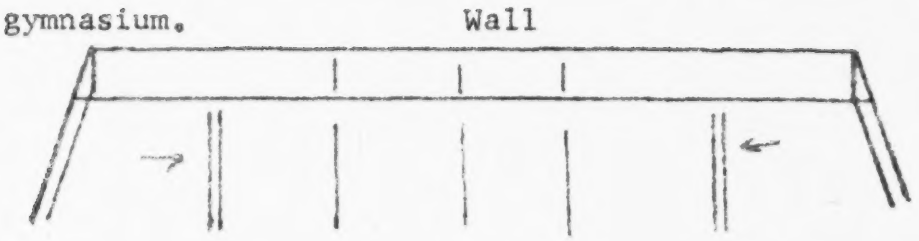
1. Continuous Shot Put

A. Space Needed - 30 by 15 feet or the width of the gymnasium

B. Equipment - Four 4 pound indoor shot

C. Procedure - Divide the group into two groups, with one group at one side of the 30 feet section and the other group opposite them. Each side has a restraining line. This is convenient to do at the end of

the gymnasium.



The double lines are the restraining lines. They must keep their feet behind them when putting the shot. Mark the floor or wall with lines which represent certain scores or distances so that the children will be able to see if they are improving. They will take turns, each child having two puts. The action is constant from both sides so that two children are working at the same time.

D. Activity

(1) Stand tall with head high, feet together and hands at side.

(2) At the count of 1, jump to a stride position while raising arms above head. Clap hands together. On 2, jump back to starting position with feet together and hands at side.

(3) Feet slightly apart.

(4) Raise arms upward until they are even with shoulders. Arms straight. Palms up.

(5) Moving in small circles, rotate the whole arm (both arms) in a backward motion, keeping shoulders and head tall (10 times).

(6) Reverse position and rotate arms in forward circles.

3. Side Horse

A. Space Needed - 15 by 10 feet.

B. Equipment

(1) Elementary sized horse that is adjustable in height

(2) mats

C. Basic Movements

(1) a two foot take off

(2) keeping weight of body up and over arms

(3) a good take off jump with knees raised high for some vaults

D. Activities

(1) Support mount

(a) Walk forward, grasp pommels with both hands, take a two-foot take off

(b) Keeping back straight and tall and head up, jump to raise body so that the arms are straight and the body rests against the horse.

(c) Point toes and slightly arch back

(d) hold for a few seconds and then push body back from horse. Dismount by landing in a bent knee position

(2) Modified Squat Vault

(a) walk forward toward horse, grasp both pommels

(b) with a two foot take off, jump up, bend knees and place both feet on saddle of horse

(c) stand and balance

(d) simply jump off with knees bent or in a candlestick dismount

(3) Candlestick

(a) stand on saddle and bring arms to sides and backwards

(b) throwing arms upward and arching back slightly, jump off and land with knee bent on both feet

(4) Squat Vault

(a) approach horse with a two foot take off. Grasp both pommels

(b) Jump up, bending knees and keeping toes up

(c) Arms straight. Shoot feet through and over the saddle without touching and land on both feet with bent knees.

(5) Courage Vault

(a) Approach horse with a two foot take off. Grasp both pommels

(b) Jump up and bend knees, placing knees and lower legs on saddle

(c) Take hands off the pommels and sit tall.

(d) Throw arms backward and jump off the horse landing on both feet with bent knees.

E. Spotting

(1) Be sure children do not hunch shoulders

(2) For most vaults, the spotter stands in back of horse, to one side and assists the child by grasping the upper arm

(3) Children should be clearly taught that they may not work on the side horse without mats and a spotter.

Activities to Improve Flexibility
(Measured primarily by the test item Flex Test)

1. Sit and Bend

A. Equipment - One Flex Tester

B. Space Needed - 12 by 12 feet

C. Procedure - Child will take turn at Flex Tester. When he has completed his turn, he will assist and measure the next, making sure each child's legs are straight and that their feet are firmly placed against the Flex Tester. This way there are always two children at the Tester, one measuring and one working.

2. Toe Touching and Bobbing

   A. Space Needed - 10 by 10 feet

   B. Equipment - none

   C. Activity

      (1) Stand with arms straight and stretched over head

      (2) Bend over and place fingertips on toes. Legs straight.

      (3) Remaining in this position, bob up and down touching toes.

      (4) Stand up, stretching arms over head with arms straight.

3. Sit and Reach

   A. Space needed - 10 by 10 feet

   B. Equipment - none

   C. Activity

      (1) sitting position with back tall and head high

      (2) Spread legs outward in a good stride position, keeping knees down on floor and legs straight

      (3) On the count of 1, reach forward and grasp the right ankle with both hands, keeping legs straight. Bend at waist and lower body until the forehead touches the right knee. On 2 and 3 touch two times. On count 4, leg go of ankle and sit tall with arms at side. Repeat to left.

      (4) Vary by putting legs together and doing the same exercise.

4. Straddle Lean

   A. Space Needed - 10 by 10 feet

   B. Equipment - none

   C. Activity

      (1) sitting position with legs outstretched and straight

(2) grasp the right ankle with the right hand and the left ankle with the left hand, keeping the legs straight.

(3) bend forward slowly at waist and try to touch the forehead to the floor

(4) to improve this, try to touch the chin to the floor

5. Waist Bend

A. Space Needed - 10 by 10 feet

B. Equipment - none

C. Activity

(1) Stand tall with head high and with hands on hips

(2) to the count of: 1, 2, 3, 4 face forward and bend sidewards 4 times to the right, taking care to keep legs straight and feet on floor

1, 2, 3, 4 bend backward four times

1, 2, 3, 4 bend sidewards 4 times to left

1, 2, 3, 4 bend forward from waist 4 times

(3) start from beginning and repeat

6. Bridge

A. Space Needed - 10 by 10 feet

B. Equipment - none

C. Activity

(1) lie on back

(2) reach back with arms and place palms on floor at shoulder level with fingers pointing toward toes

(3) keeping feet flat on the floor, push with hands and feet until the

body is up as high as you can go. Arms straight and head off of the floor. Be careful of the feet slipping. If the floor is very slippery, place feet against wall.

(4) Lower body to floor by bending elbows and slowly and gently sliding down on the back of the head and shoulders.

(5) Repeat. This is a good lead-up exercise for backbends and other tumbling skills.

7. Backbend

A. Space Needed - 10 by 10 feet

B. Equipment

(1) mat

(2) Spotting helps, towel

C. Activity

(1) stand with legs slightly apart. Raise arms upward and backward

(2) Bending knees slightly, push hips forward and lean over backward, keeping head back and looking toward the floor

(3) place hands on floor

(4) arms must not bend

(5) shifting body weight from hands to feet, pull with abdominals and stand

Activities to Improve Muscular Strength and Endurance
(Measured primarily by test items Flexed Arm Hang, Curl Up, Squat Jump; and Secondarily by test items Shot Put and Standing Broad Jump)

1. Squat Jump

A. Space Needed

B. Equipment - one mat

C. Procedure - The child begins from a crouched position with his arms on the outside of his knees, and his hands touching the mat. The child jumps into the air to an approximate height of four inches as he extends his legs and trunk. When landing from a jump he continues into the crouched position for the next jump. The child may score himself by counting the correct number of jumps he can perform without stopping.

2. Curl Up

A. Space Needed - fourteen feet by fourteen feet

B. Equipment - one mat

C. Procedure - the children work in pairs. One lies on his back to do the curl up, with his hands behind his head. His partner kneels and holds his ankles to keep his soles in contact with the mat. The child must sit up to the vertical position on each curl up.

3. Bar Hang

A. Space Needed - approximately 18 by 14 feet or a wall pull-up bar and the space for a protective mat under it. The extra space is for additional children in the group.

B. Equipment - horizontal bar and mat

C. Procedure - the child stands on a chair and grasps a horizontal bar in a flexed position with palms toward him grip", and with his chin above and not touching the bar. The children count their own seconds by saying "Mississippi 1, Mississippi 2," etc. When their chin touches the bar or when they raise their head to avoid the chin touching, they stop.

4. Push-up

A. Space Needed - 10 by 10 feet

B. Equipment - none

C. Procedure

(1) lie down face downward.

(2) Place hands on floor at shoulder area, shoulder width apart

(3) Feet together

(4) Lift body until weight is supported on the hands and feet. Body is straight from head to heels.

(5) Arms straight

(6) Bend elbows and lower body until chin or nose touches the floor.

(7) Back must be kept straight. No sagging of stomach or raising of buttocks.

(8) Straighten elbows and return to starting position.

5. Sit-up

A. Space Needed - 10 by 10 feet

B. Equipment - none

C. Procedure

(1) Lie on back with arms straight overhead on the floor. This is a good learning sit-up position. They may quickly progress to hands behind neck and elbows out.

(2) Raise body upward and forward by bending at waist. Keep arms straight overhead as you move forward.

(3) Lean forward until hands touch toes or extend beyond them. This may be varied for flexibility by touching head to knees. Return to starting position.

(4) When hands are clasped behind the head with fingers interlaced, the sit-up is done by leaning forward until the right elbow touches the left knee (rotation at waist) Keep elbow out. Then return to

supine position and raise up again, this time touching the left elbow to the right knee.

(5) The shoulders should go back on the floor each time.

(6) Knees may be raised several inches off of the floor if the child is having difficulty with flexibility.

6. Crazy Relay

A. Space Needed - gymnasium or playground

B. Equipment Needed - none

C. Formation

(1) class is divided into equal teams. The runners stand in lines, one behind the other.

D. How to Play

(1) Each player in each line is assigned to run a special way

(2) All number ones in each line will be crabs

(a) they will move backwards on hands and feet to the line opposite their line (or wall or standing child). They will run back to the line and touch the second runner

(3) All number twos in each line will be bunnies and hop on two feet up and run back

(4) All number 3s in each line will be plain runners and they will run up and back

(5) All number 4s in each line will be frogs and they will get down on hands and feet with knees bent and hop forward on all fours and run back.

(6) All number 5s will be monkeys. They will run forward on all fours like a monkey.

(7) All number 6s in each line will be skippers. They run back

E. Variations - Invent new movements and animals

Activities to Improve Speed
(Measured primarily by test item Thirty-Yard Dash, and secondarily by test items Zig Zag Run and Three-Hundred Yard Run)

1. Partner Dash

A. Space Needed - as long a space as possible in the gym. Use length of gym with protective mats at each end of running lane. Establish a starting line. Approximately 60 by 12 feet.

B. Equipment - Two mats

C. Procedure - Have two children run at one time. They say "Ready, Go" and run at top speed to the opposite end of the running lane. They touch mat and return to the starting line. Two more children are waiting to run

2. Steal the Bacon

A. Space Needed - gymnasium or playground

B. Equipment - indian club

C. Formation 1 2 3 4 5 6 7 8 two equal teams lined up at opposite ends X of the gym behind the line. Each player has a 8 7 6 5 4 3 2 1 number as above. In the center is placed an indian club.

D. How to Play

(1) After each player has a number as in the drawing, the teacher calls a number.

(2) When a number is called, the child from each side with that number runs into the center toward the indian club.

(3) The purpose of the game and the way to score a point is to try to pick up the indian club and run back to your place in line without being tagged by the other player with the same number

(4) In most cases, it is a question of judgment in when it is safe to pick up the pin.

(5) If the person running back to his line with the club in his hand is tagged, the point goes to the tagger's team. If he makes it, the point goes to the team whose player got there safely.

(6) Call each number one time and count score.

3. Running Relay

A. Space Needed - gymnasium or playground

B. Equipment - none

C. Formation

(1) Divide class into equal teams

(2) Establish a line by floor markings or tape where the leader of each line stands.

(3) If there are no protective wall mats inside against which they may touch, choose a child from each line to stand opposite his line. He will stand with hands on hips. The runner must touch one elbow.

D. How to Play

(1) Runners must run up to wall or child, touch and return, touching the next person waiting to run in his line.

(2) The waiting runner will outstretch his right arm and the runner will tag it and proceed up the legal running "alley" of his team. He will sit down showing he has had a turn.

(3) When all runners have had one turn, the winning team is determined by whose last runner crosses the finish line first.

E. Variations of the running relay

(1) Run up, touch and skip back

(2) Skip up, toubh and skip back

(3) Hop up on two feet, touch, and run back

4. Indian Club Relay

A. Space Needed - gymnasium or playground

B. Equipment - one indian club for each line

C. Formation

(1) Divide the class into equal teams, one player in back of the other

(2) Place the Indian Club opposite each line

D. How to Play

(1) At the teacher's command, the first runner in each line will run forward, grab his Indian Club, turn around and run back to the next waiting runner.

(2) This new runner runs forward and places the club in the line or spot where it was

(3) He then runs back to his line without the club and touches the next waiting runner

(4) This new runner then runs up, grabs the club and runs back to hand it to the next runner in line.

(5) This continues until all have had a turn.

(6) The winning team is determined by whose last runner crosses the finish line first.

APPENDICES

Appendix A

GROSS MOTOR PERFORMANCE SCREENING TEST
Bucks County Schools

NAME _____ BIRTH DATE _____
Last First

	Test 1	Test 2	Test 3	Test 4	Test 5
Test Date					
School					
Grade					
Age (Mos.)					
Height (Ins.)					
Weight (Lbs.)					

Test 1		Test 2		Test 3		Test 4		Test 5	
Raw	Std	Raw	Std	Raw	Std	Raw	Std	Raw	Std

Test Items:

1. St. Br. Jump
2. Shot Put
3. 30 Yard Dash
4. 300 Yard Run
5. Flexed Arm Hg.
6. Curl Up
7. Squat Jump
8. Tprd Bal. Bm.
9. Flex. Test
10. Zig Zag Run
11. Ball Throw
12. Throw/Catch
13. Ball Kick
14. Std. Sc. Tl.
15. Std. Sc. Av.

TEST PROFILE

Code Test:
First - red ☐ Third - green ☐
Second - yellow ☐ Fourth - blue ☐
Fifth - black ☐

Standard Score

100 95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10 5

Tester: _____ Date _____
Name
Comments:

Tester: _____ Date _____
Name
Comments:

Tester: _____ Date _____
Name
Comments:

Tester: _____ Date _____
Name
Comments:

Tester: _____ Date _____
Name
Comments:

Prepared By: Dr. Donald Hilsendager February, 1969
Temple University

GAME REPERTOIRE

Suggested Score Card

APPENDIX B

DESCRIPTION OF FLEX TESTER

Two pieces of 1" by 12" boards are used to form the main structure of the Flex Tester. One piece is 18 inches long. The other piece is 40 inches long. They are placed so they are on edge and horizontal to the floor, i.e. so they are each 12 inches high. The 18 inch board is nailed to one end of the 40 inch board. The 18 inch board should extend an equal distance (nine inches) on each side of the point where the side of it is nailed to the end of the 40 inch board. The main structure of the Flex Tester looks like a T laying on the floor. The 18 inch board is referred to as the foot board and the 40 inch board as the main support. Two ten inch 2" by 4" should be nailed vertically to the sides (one on each side) of the main support and the foot board to strengthen the main support-foot board joint.

A groove one and one half inches deep and one inch wide is cut lengthwise in the center of one surface of a 4" by 4" which is eight inches long. This is called the marker and is placed on top of the main support with the main support fitting loosely into the groove of the marker. One eye screw is screwed into the center of the top surface of the marker one inch in from each end of the marker. The diameter of the opening in the eye screw should be three fourths of an inch.

A sliding caliper with a handle bar is constructed to slide through the two eye screws of the marker. The sliding caliper is a wooden dowel 40 inches long and one half inch in diameter. A larger dowel (diameter one and one half inches and twelve inches long) is fastened to one end of the sliding caliper by drilling

a hole in the center (lengthwise) of the large dowel to allow the sliding caliper to be inserted and nailed into the large dowel. The large dowel fastened to the end of the sliding caliper is called the handle bar.

The unattached end of the sliding caliper is inserted into the two eye screws of the marker and a screw is placed crosswise through the unattached end of the sliding caliper one inch from the end. The holding screw prevents the sliding caliper from being withdrawn from the eye screws of the marker.

One fourth of an inch along the sliding caliper, away from the holding screw and toward the handle bar, a black line is drawn around the sliding caliper. This is the zero line. From the zero line to the handle bar, black lines are drawn around the sliding caliper at inch intervals. One half inch lines are drawn in red. The number of inches from the zero line is printed on each of the inch lines. This completes the construction of the Flex Tester. The total cost of materials should be less than five dollars.

One modification of the main structure of the Flex Tester is possible if it is desired to make it collapsible for more compact storage or transportation. The modification involves drilling two holes through the 2" by 4"s and the main support. The 2" by 4"s are still nailed to the foot board, but the foot board is no longer nailed to the main support. When in use, the main support is maintained in contact with the foot board by two small bolts which have been placed through the two holes in the two by fours and the main support. Wing nuts on the small bolts allow for quick dismantling of the main structure of the Flex Tester.

APPENDIX C

DESCRIPTION OF TAPERED BALANCE BEAM

Four balance beams of five feet each are to be used. They are to be placed end to end to form a continuous length of twenty feet. Cutting instructions are as follows. Two inch by 6" boards are used and placed in the end to end position. Two lines are marked on the top surface of the boards. The lines begin four inches apart at the start of the first board and taper (angle) until they come together at the end of the third board (the distance of this taper is 15 feet). The line is marked as a single line down the center of the last board. The boards are now ready for cutting. They should be cut on the line using a 70 degree angle which results in the beam being wider at the bottom. This results in the top surface of the beam remaining as marked.

Five boards are screwed to the bottom of the four beams for reinforcement. In order to hold the four tapered beams together, the reinforcing boards overlap the ends of each of the tapered beams. This is accomplished by using four feet 2" by 4"s as the reinforcement boards. The screws which mount the reinforcement boards to the center of the bottom of the tapered beams should not protrude through the top surface of the tapered beams.

The sides and top surface of the tapered beams are marked in inches. At the end of each inch a line is drawn across the top and down the sides of the tapered beams. Numbers which correspond to the distance in inches from the start (widest part of the beam) of the first beam are marked on the sides of the tapered beam. These numbers should run from one through 240 for a 20 foot beam. This completes construction of the tapered balance beam.

It should be noted that for ease in transporting the beam it is possible to remove the screws which hold the reinforcing boards to the tapered beams with the result that the longest section to move would be only five feet long.

APPENDIX D

DESCRIPTION OF WALL TARGET AND FLOOR MARKINGS FOR THE THROW AND CATCH TEST ITEM

Five two-foot squares are marked on the floor. The first square is three feet from the wall and the other four are behind each other at a distance of one foot each. A target is marked on a flat wall surface with half inch tape. The target is three feet square and the bottom is four feet from the floor. The center area of the target is an inner square ten inches from each of the sides.

APPENDIX E

DESCRIPTION OF WALL TARGET AND FLOOR MARKINGS FOR THE BALL KICK TEST ITEM

A five foot high and ten foot wide target is marked on a flat wall surface with half inch tape. The target area is marked into three rectangles with the second rectangle three feet high and six feet wide. The center rectangle is one foot high and two feet wide. The five is marked in the small target area, a three in the middle area, and a one in the largest area. There are three lines placed on the floor. Each floor line is three feet long and parallel to the wall target. The first floor line is ten feet from the wall, the second is twenty feet, and the third is thirty feet from the wall target.

APPENDIX F

DESCRIPTION OF THE COURSE FOR THE ZIG ZAG RUN TEST ITEM

A six inch X is placed on a wall four feet from the floor. A folding chair is placed on the floor six feet from the wall. A second chair is placed six feet behind the first chair, a third chair six feet behind the second, and a fourth six feet behind the third chair. A one foot starting line is placed six feet behind the fourth chair.

APPENDIX G

HULL SCORES[3]

[3]Robert Von Drach. Personal Communication with Robert Von Drach, Bucks County Public Schools, Bucks County Administration Building, Doylestown, Pennsylvania, 1969.

HULL SCORE	AGE	HEIGHT	WEIGHT	STANDING BROAD JUMP	SHOT PUT
100	107.2	65.0	86.5	62.7	211.1
99	106.8	64.7	85.8	62.2	208.8
98	106.5	64.3	85.2	61.8	206.5
97	106.1	64.0	84.5	61.3	204.2
96	105.7	63.7	83.9	60.8	201.9
95	105.4	63.4	83.3	60.3	199.6
94	105.0	63.1	82.6	59.8	197.3
93	104.6	62.7	82.0	59.4	195.0
92	104.2	62.4	81.3	58.9	192.7
91	103.9	62.1	80.7	58.4	190.3
90	103.5	61.8	80.0	57.9	188.0
89	103.1	61.4	79.4	57.4	185.7
88	102.8	61.1	78.7	57.0	183.4
87	102.4	60.8	78.1	56.5	181.1
86	102.0	60.5	77.4	56.0	178.8
85	101.7	60.1	76.8	55.5	176.5
84	101.3	59.8	76.1	55.0	174.2
83	100.9	59.5	75.5	54.6	171.9
82	100.6	59.2	74.9	54.1	169.6
81	100.2	58.9	74.2	53.6	167.3
80	99.8	58.5	73.6	53.1	165.0
79	99.5	58.2	72.9	52.6	162.7
78	99.1	57.9	72.3	52.2	160.4
77	98.7	57.6	71.6	51.7	158.1

HULL SCORE	AGE	HEIGHT	WEIGHT	STANDING BROAD JUMP	SHOT PUT
76	98.4	57.2	71.0	51.2	155.8
75	98.0	56.9	70.3	50.7	153.5
74	97.6	56.6	69.7	50.2	151.2
73	97.3	56.3	69.0	49.8	148.8
72	96.9	56.0	68.4	49.3	146.5
71	96.5	55.6	67.7	48.8	144.2
70	96.2	55.3	67.1	48.3	141.9
69	95.8	55.0	66.4	47.8	139.6
68	95.4	54.7	65.8	47.4	137.3
67	95.1	54.3	65.2	46.9	135.0
66	94.7	54.0	64.5	46.4	132.7
65	94.3	53.7	63.9	45.9	130.4
64	94.0	53.4	63.2	45.4	128.1
63	93.6	53.1	62.6	45.0	125.8
62	93.2	52.7	61.9	44.5	123.5
61	92.9	52.4	61.3	44.0	121.2
60	92.5	52.1	60.6	43.5	118.9
59	92.1	51.8	60.0	43.0	116.6
58	91.8	51.4	59.3	42.6	114.3
57	91.4	51.1	58.7	42.1	112.0
56	91.0	50.8	58.0	41.6	109.7
55	90.7	50.5	57.4	41.1	107.4
54	90.3	50.2	56.8	40.6	105.0
53	89.9	49.8	56.1	40.1	102.7

HULL SCORE	AGE	HEIGHT	WEIGHT	STANDING BROAD JUMP	SHOT PUT
52	89.6	49.5	55.5	39.7	100.4
51	89.2	49.2	54.8	39.2	98.1
50	88.8	48.9	54.2	38.7	95.8
49	88.4	48.5	53.5	38.2	93.5
48	88.1	48.2	52.9	37.7	91.2
47	87.7	47.9	52.2	37.3	88.9
46	87.3	47.6	51.6	36.8	86.6
45	87.0	47.3	50.9	36.3	84.3
44	86.6	46.9	50.3	35.8	82.0
43	86.2	46.6	49.6	35.3	79.7
42	85.9	46.3	49.0	34.9	77.4
41	85.5	46.0	48.4	34.4	75.1
40	85.1	45.6	47.7	33.9	72.8
39	84.8	45.3	47.1	33.4	70.5
38	84.4	45.0	46.4	32.9	68.2
37	84.0	44.7	45.8	32.5	65.9
36	83.7	44.4	45.1	32.0	63.5
35	83.3	44.0	44.5	31.5	61.2
34	82.9	43.7	43.8	31.0	58.9
33	82.6	43.4	43.2	30.5	56.6
32	82.2	43.1	42.5	30.1	54.3
31	81.8	42.7	41.9	29.6	52.0
30	81.5	42.4	41.2	29.1	49.7
29	81.1	42.1	40.6	28.6	47.4

HULL SCORE	AGE	HEIGHT	WEIGHT	STANDING BROAD JUMP	SHOT PUT
28	80.7	41.8	40.0	28.1	45.1
27	80.4	41.5	39.3	27.7	42.8
26	80.0	41.1	38.7	27.2	40.5
25	79.6	40.8	38.0	26.7	38.2
24	79.3	40.5	37.4	26.2	35.9
23	78.9	40.2	36.7	25.7	33.6
22	78.5	39.8	36.1	25.3	31.3
21	78.2	39.5	35.4	24.8	29.0
20	77.8	39.2	34.8	24.3	26.7
19	77.4	38.9	34.1	23.8	24.4
18	77.1	38.6	33.5	23.3	22.0
17	76.7	38.2	32.8	22.9	19.7
16	76.3	37.9	32.2	22.4	17.4
15	76.0	37.6	31.6	21.9	15.1
14	75.6	37.3	30.9	21.4	12.8
13	75.2	36.9	30.3	20.9	10.5
12	74.9	36.6	29.6	20.5	8.2
11	74.5	36.3	29.0	20.0	5.9
10	74.1	36.0	28.3	19.5	3.6
9	73.8	35.7	27.7	19.0	1.3
8	73.4	35.3	27.0	18.5	-1.0
7	73.0	35.0	26.4	18.1	-3.3
6	72.6	34.7	25.7	17.6	-5.6
5	72.3	34.4	25.1	17.1	-7.9

HULL SCORE	AGE	HEIGHT	WEIGHT	STANDING BROAD JUMP	SHOT PUT
4	71.9	34.0	24.4	16.6	-10.2
3	71.5	33.7	23.8	16.1	-12.5
2	71.2	33.4	23.2	15.7	-14.8
1	70.8	33.1	22.5	15.2	-17.1
0	70.4	32.8	21.9	14.7	-19.5

HULL SCORE	FLEXED ARM HANG	CURL UP	SQUAT JUMP	TAPERED BALANCE BEAM	FLEXIBILITY TEST	BALL THROW
100	64.6	63.0	36.1	251.8	27.2	93.9
99	63.7	62.1	35.6	249.8	27.0	92.7
98	62.7	61.2	35.1	247.7	26.8	91.5
97	61.7	60.3	34.6	245.6	26.6	90.3
96	60.7	59.3	34.1	243.5	26.5	89.1
95	59.7	58.4	33.6	241.4	26.3	87.9
94	58.8	57.5	33.1	239.3	26.1	86.7
93	57.8	56.6	32.6	237.3	25.9	85.5
92	56.8	55.7	32.1	235.2	25.8	84.3
91	55.8	54.8	31.6	233.1	25.6	83.2
90	54.9	53.9	31.1	231.0	25.4	82.0
89	53.9	53.0	30.6	228.9	25.2	80.8
88	52.9	52.1	30.1	226.8	25.1	79.6
87	51.9	51.2	29.6	224.8	24.9	78.4
86	51.0	50.3	29.1	222.7	24.7	77.2
85	50.0	49.4	28.6	220.6	24.5	76.0
84	49.0	48.5	28.1	218.5	24.4	74.8
83	48.0	47.5	27.6	216.4	24.2	73.6
82	47.1	46.6	27.1	214.3	24.0	72.4
81	46.1	45.7	26.6	212.3	23.8	71.2
80	45.1	44.8	26.1	210.2	23.7	70.0
79	44.1	43.9	25.6	208.1	23.5	68.8
78	43.2	43.0	25.1	206.0	23.3	67.6
77	42.2	42.1	24.6	203.9	23.1	66.4

HULL SCORE	FLEXED ARM HANG	CURL UP	SQUAT JUMP	TAPERED BALANCE BEAM	FLEXIBILITY TEST	BALL THROW
76	41.2	41.2	24.1	201.8	23.0	65.2
75	40.2	40.3	23.6	199.8	22.8	64.0
74	39.2	39.4	23.1	197.7	22.6	62.8
73	38.3	38.5	22.6	195.6	22.4	61.6
72	37.3	37.6	22.1	193.5	22.3	60.4
71	36.3	36.7	21.6	191.4	22.1	59.2
70	35.3	35.7	21.1	189.3	21.9	58.0
69	34.4	34.8	20.6	187.3	21.7	56.8
68	33.4	33.9	20.1	185.2	21.6	55.6
67	32.4	33.0	19.6	183.1	21.4	54.4
66	31.4	32.1	19.1	181.0	21.2	53.2
65	30.5	31.2	18.6	178.9	21.0	52.0
64	29.5	30.3	18.1	176.8	20.9	50.8
63	28.5	29.4	17.6	174.8	20.7	49.6
62	27.5	28.5	17.1	172.7	20.5	48.4
61	26.6	27.6	16.6	170.6	20.3	47.3
60	25.6	26.7	16.1	168.5	20.2	46.1
59	24.6	25.8	15.6	166.4	20.0	44.9
58	23.6	24.9	15.1	164.3	19.8	43.7
57	22.7	23.9	14.6	162.3	19.6	42.5
56	21.7	23.0	14.1	160.2	19.5	41.3
55	20.7	22.1	13.6	158.1	19.3	40.1
54	19.7	21.2	13.1	156.0	19.1	38.9
53	18.7	20.3	12.6	153.9	18.9	37.7

HULL SCORE	FLEXED ARM HANG	CURL UP	SQUAT JUMP	TAPERED BALANCE BEAM	FLEXIBILITY TEST	BALL THROW
52	17.8	19.4	12.1	151.8	18.8	36.5
51	16.8	18.5	11.6	149.8	18.6	35.3
50	15.8	17.6	11.1	147.7	18.4	34.1
49	14.8	16.7	10.6	145.6	18.2	32.9
48	13.9	15.8	10.1	143.5	18.1	31.7
47	12.9	14.9	9.6	141.4	17.9	30.5
46	11.9	14.0	9.1	139.3	17.7	29.3
45	10.9	13.1	8.6	137.3	17.5	28.1
44	10.0	12.1	8.1	135.2	17.4	26.9
43	9.0	11.2	7.6	133.1	17.2	25.7
42	8.0	10.3	7.1	131.0	17.0	24.5
41	7.0	9.4	6.6	128.9	16.8	23.3
40	6.1	8.5	6.1	126.8	16.7	22.1
39	5.1	7.6	5.6	124.8	16.5	20.9
38	4.1	6.7	5.1	122.7	16.3	19.7
37	3.1	5.8	4.6	120.6	16.1	18.5
36	2.2	4.9	4.1	118.5	16.0	17.3
35	1.2	4.0	3.6	116.4	15.8	16.1
34	.2	3.1	3.1	114.3	15.6	14.9
33	-.8	2.2	2.6	112.3	15.4	13.7
32	-1.8	1.3	2.1	110.2	15.3	12.6
31	-2.7	.3	1.6	108.1	15.1	11.4
30	-3.7	-.6	1.1	106.0	14.9	10.2
29	-4.7	-1.5	.6	103.9	14.7	9.0

HULL SCORE	FLEXED ARM HANG	CURL UP	SQUAT JUMP	TAPERED BALANCE BEAM	FLEXIBILITY TEST	BALL THROW
28	-5.7	-2.4	.1	101.8	14.6	7.8
27	-6.6	-3.3	-.4	99.8	14.4	6.6
26	-7.6	-4.2	-.9	97.7	14.2	5.4
25	-8.6	-5.1	-1.4	95.6	14.0	4.2
24	-9.6	-6.0	-1.9	93.5	13.9	3.0
23	-10.5	-6.9	-2.4	91.4	13.7	1.8
22	-11.5	-7.8	-2.9	89.3	13.5	.6
21	-12.5	-8.7	-3.4	87.3	13.3	-.6
20	-13.5	-9.6	-3.9	85.2	13.2	-1.8
19	-14.4	-10.5	-4.4	83.1	13.0	-3.0
18	-15.4	-11.5	-4.9	81.0	12.8	-4.2
17	-16.4	-12.4	-5.4	78.9	12.6	-5.4
16	-17.4	-13.3	-5.9	76.8	12.5	-6.6
15	-18.3	-14.2	-6.4	74.8	12.3	-7.8
14	-19.3	-15.1	-6.9	72.7	12.1	-9.0
13	-20.3	-16.0	-7.4	70.6	11.9	-10.2
12	-21.3	-16.9	-7.9	68.5	11.8	-11.4
11	-22.3	-17.8	-8.4	66.4	11.6	-12.6
10	-23.2	-18.7	-8.9	64.3	11.4	-13.8
9	-24.2	-19.6	-9.4	62.3	11.2	-15.0
8	-25.2	-20.5	-9.9	60.2	11.1	-16.2
7	-26.2	-21.4	-10.4	58.1	10.9	-17.4
6	-27.1	-22.3	-10.9	56.0	10.7	-18.6
5	-28.1	-23.3	-11.4	53.9	10.5	-19.8

HULL SCORE	FLEXED ARM HANG	CURL UP	SQUAT JUMP	TAPERED BALANCE BEAM	FLEXIBILITY TEST	BALL THROW
4	-29.1	-24.2	-11.9	51.8	10.4	-21.0
3	-30.1	-25.1	-12.4	49.8	10.2	-22.2
2	-31.0	-26.0	-12.9	47.7	10.0	-23.3
1	-32.0	-26.9	-13.4	45.6	9.8	-24.5
0	-33.0	-27.8	-13.9	43.5	9.7	-25.7

HULL SCORE	BALL THROW AND CATCH	BALL KICK	THIRTY YARD DASH	THREE HUNDRED YARD RUN	ZIG-ZAG RUN
100	62.2	48.1	4.2	51.7	6.3
99	61.5	47.7	4.3	52.5	6.4
98	60.8	47.2	4.4	53.4	6.5
97	60.2	46.7	4.4	54.2	6.6
96	59.5	46.3	4.5	55.1	6.6
95	58.8	45.8	4.5	55.9	6.7
94	58.1	45.4	4.6	56.8	6.8
93	57.5	44.9	4.6	57.7	6.9
92	56.8	44.4	4.7	58.5	6.9
91	56.1	44.0	4.8	59.4	7.0
90	55.4	43.5	4.8	60.2	7.1
89	54.7	43.1	4.9	61.1	7.2
88	54.1	42.6	4.9	62.0	7.2
87	53.4	42.1	5.0	62.8	7.3
86	52.7	41.7	5.1	63.7	7.4
85	52.0	41.2	5.1	64.5	7.4
84	51.3	40.8	5.2	65.4	7.5
83	50.7	40.3	5.2	66.3	7.6
82	50.0	39.8	5.3	67.1	7.7
81	49.3	39.4	5.4	68.0	7.7
80	48.6	38.9	5.4	68.8	7.8
79	47.9	38.5	5.5	69.7	7.9
78	47.3	38.0	5.5	70.6	8.0
77	46.6	37.5	5.6	71.4	8.0

HULL SCORE	BALL THROW AND CATCH	BALL KICK	THIRTY YARD DASH	THREE HUNDRED YARD RUN	ZIG-ZAG RUN
76	45.9	37.1	5.6	72.3	8.1
75	45.2	36.6	5.7	73.1	8.2
74	44.5	36.1	5.8	74.0	8.3
73	43.9	35.7	5.8	74.8	8.3
72	43.2	35.2	5.9	75.7	8.4
71	42.5	34.8	5.9	76.6	8.5
70	41.8	34.3	6.0	77.4	8.6
69	41.1	33.8	6.1	78.3	8.6
68	40.5	33.4	6.1	79.1	8.7
67	39.8	32.9	6.2	80.0	8.8
66	39.1	32.5	6.2	80.9	8.9
65	38.4	32.0	6.3	81.7	8.9
64	37.8	31.5	6.3	82.6	9.0
63	37.1	31.1	6.4	83.4	9.1
62	36.4	30.6	6.5	84.3	9.2
61	35.7	30.2	6.5	85.2	9.2
60	35.0	29.7	6.6	86.0	9.3
59	34.4	29.2	6.6	86.9	9.4
58	33.7	28.8	6.7	87.7	9.5
57	33.0	28.3	6.8	88.6	9.5
56	32.3	27.9	6.8	89.4	9.6
55	31.6	27.4	6.9	90.3	9.7
54	31.0	26.9	6.9	91.2	9.8
53	30.3	26.5	7.0	92.0	9.8

HULL SCORE	BALL THROW AND CATCH	BALL KICK	THIRTY YARD DASH	THREE HUNDRED YARD RUN	ZIG-ZAG RUN
52	29.6	26.0	7.1	92.9	9.9
51	28.9	25.6	7.1	93.7	10.0
50	28.2	25.1	7.2	94.6	10.1
49	27.6	24.6	7.2	95.5	10.1
48	26.9	24.2	7.3	96.3	10.2
47	26.2	23.7	7.3	97.2	10.3
46	25.5	23.3	7.4	98.0	10.3
45	24.8	22.8	7.5	98.9	10.4
44	24.2	22.3	7.5	99.8	10.5
43	23.5	21.9	7.6	100.6	10.6
42	22.8	21.4	7.6	101.5	10.6
41	22.1	20.9	7.7	102.3	10.7
40	21.4	20.5	7.8	103.2	10.8
39	20.8	20.0	7.8	104.1	10.9
38	20.1	19.6	7.9	104.9	10.9
37	19.4	19.1	7.9	105.8	11.0
36	18.7	18.6	8.0	106.6	11.1
35	18.1	18.2	8.0	107.5	11.2
34	17.4	17.7	8.1	108.3	11.2
33	16.7	17.3	8.2	109.2	11.3
32	16.0	16.8	8.2	110.1	11.4
31	15.3	16.3	8.3	110.9	11.5
30	14.7	15.9	8.3	111.8	11.5
29	14.0	15.4	8.4	112.6	11.6

HULL SCORE	BALL THROW AND CATCH	BALL KICK	THIRTY YARD DASH	THREE HUNDRED YARD RUN	ZIG-ZAG RUN
28	13.3	15.0	8.5	113.5	11.7
27	12.6	14.5	8.5	114.4	11.8
26	11.9	14.0	8.6	115.2	11.8
25	11.3	13.6	8.6	116.1	11.9
24	10.6	13.1	8.7	116.9	12.0
23	9.9	12.7	8.8	117.8	12.1
22	9.2	12.2	8.8	118.7	12.1
21	8.5	11.7	8.9	119.5	12.2
20	7.9	11.3	8.9	120.4	12.3
19	7.2	10.8	9.0	121.2	12.4
18	6.5	10.4	9.0	122.1	12.4
17	5.8	9.9	9.1	122.9	12.5
16	5.1	9.4	9.2	123.8	12.6
15	4.5	9.0	9.2	124.7	12.7
14	3.8	8.5	9.3	125.5	12.7
13	3.1	8.0	9.3	126.4	12.8
12	2.4	7.6	9.4	127.2	12.9
11	1.7	7.1	9.5	128.1	12.9
10	1.1	6.7	9.5	129.0	13.0
9	.4	6.2	9.6	129.8	13.1
8	-.3	5.7	9.6	130.7	13.2
7	-1.0	5.3	9.7	131.5	13.2
6	-1.6	4.8	9.7	132.4	13.3
5	-2.3	4.4	9.8	133.3	13.4

HULL SCORE	BALL THROW AND CATCH	BALL KICK	THIRTY YARD DASH	THREE HUNDRED YARD RUN	ZIG-ZAG RUN
4	-3.0	3.9	9.9	134.1	13.5
3	-3.7	3.4	9.9	135.0	13.5
2	-4.4	3.0	10.0	135.8	13.6
1	-5.0	2.5	10.0	136.7	13.7
0	-5.7	2.1	10.1	137.6	13.8

APPENDIX H

PRESCRIPTION TIME COMPUTER PROGRAM

APPENDIX H

PRESCRIPTION TIME COMPUTER PROGRAM

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C     PROGRAM PREST (INPUT, OUTPUT, PUNCH)
C     PRESCRIPTION TIME (PT(J)) IN SECONDS PRINTED FOR EACH VARIABLE.
C     INDIVIDUAL HULL SCORES PRINTED AND ALSO PUNCHED FOR EACH VARIABLE.
C     HULL SCORES MAY ALSO BE PUNCHED IN ORDER OF MAGNITUDE.
C     MEAN AND STANDARD DEVIATION OF THE HULL SCALE POPULATION MUST BE
C     READ IN ACCORDANCE TO FORMATS 51 AND 52.  FORMAT 20 MUST FIT RAW
C     DATA CARDS.  VARIABLES FOR WHICH A HIGH SCORE IS DESIRABLE SCORE
C     MUST PRECEDE ALL VARIABLES FOR WHICH A LOW SCORE IS THE
C     DESIRABLE SCORE.
C     THE TOTAL NUMBER OF VARIABLES (COL. 1,2) AND NUMBER OF VARIABLES
C     FOR WHICH A HIGH SCORE IS DESIRABLE (COL. 3,4) AND NUMBER OF
C     SUBJECTS (COL. 5,6,7) MUST BE PUNCHED INTO A HEADER CARD WHICH MUST
C     DIRECTLY PRECEDE THE MEAN AND STANDARD DEVIATION CARDS WHICH MUST
C     DIRECTLY PRECEDE THE RAW DATA CARDS.  IF THE OPTION TO PUNCH THE
C     HULL SCORES FOR EACH SUBJECT IN THE ORDER OF MAGNITUDE IS DESIRED
C     A 1 MUST BE PUNCHED IN COLUMN EIGHT OF THE HEADER CARD, SEC
C     INDICATES THE NUMBER OF SECONDS AVAILABLE FOR PRESCRIPTION
C     PURPOSES AND MUST BE SET IN ACCORDANCE WITH THE TIME AVAILABLE.
C     DONALD R. HILSENDAGER-TEMPLE-DEPARTMENT OF HEALTH, PHYSICAL
C     EDUCATION, AND RECREATION.  6-1-69.
      INTEGER V
      INTERGER VH
      INTEGER VX60
      INTEGER )_
      DIMENSION  A(20), H(20), SM(20), SD(20), HU(20), G(20), PT(20)
      READ 9,V,VH,NS,OP
    9 FORMAT (I2, I2, I3, I1)
      SEC=1800
      P=0
      DO 601 I=1,V
  600 A(I)=0
      DO 601 J=1,V
  601 H(J)=0
      READ 51, (XM(J),J=1,7)
   51 FORMAT (6X,7(F10,4))
      READ 52, (SM(J),J=8,V)
   52 FORMAT (6X,7(F10,4))
      READ 51,(SD(J),J-1,7)
      READ 52,(SD(J),J=8,V)
      DO 602 J=1,V
  602 HU(J)=SD(J)*0.07
      IF (OP) 6,15,40
   15 PRINT 16
   16 FORMAT (4X,22H N   Hull SCALE SCORES)
   40 I+1
      N=1
   10 READ 20,(H(J),J=1,V),CR,SUBJ
   20 FORMAT (20X,F3.1,F4.1,F2.0,F2.0,F3.0,F3.1,F4.1,F2.0,F2.0,F3.1
      1,F4.1,F3.1)
      DO 603 J=1,VH
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```
603     H(J)=((H(J)-XM(J))/HU(J))+50
        J=0
        DO 604 K-VH,V
        J-J+1
604     H(J)=SQRTF((((H(J)-XM(J))/HU(J))-50.)**2.)
        IF (OP) 6,80,299
 80     PRINT 90,N,(H(J),J=1,V),CR,SUBJ
        DO 555 J-1,V
555     P=P+H(J)
        VX60=60*V
        P1=VX60-P
        PU=SEC/P1
        Do 556 J=1,V
556     PR(J)=(100-H(J))*PU
        PRINT 575
575     FORMAT (1H1)
        PRINT 17
 17     FORMAT (4X,29HPRESCRIPTION TIME IN SECONDS)
        PRINT 90,N,(PT(J),J=1,V),CR,SUBJ
        PRINT 575
 70     PUNCH 90,N,(H(J),J=1V),CR,SUBJ
 90     FORMAT (I5,2X,13(F5.1),6X,F2,0,F2.0)
        N=N+1
        NST=NS-N
        TF (NST) 6,10,10
  6     STOP
299     I=1.
300     K=1.
        J=1.
311     J=J+1
        IF (JJ) 314,312,312
312     HH=G(K)-H(J)
        IF (HH) 313,313,311
313     K=J
        GO TO 311
314     A(I)=G(K)+(*100)
        I=I+1
        G(K)=0
        J=K
        H(J)=0
        C=V-I
        IF (C) 500,300,300
500     PUNCH 90,N,(A(I),I=1,V),C$,SUBJ
        N=N+1
        NST=NS-N
        IF (NST) 5,10,10
  5     STOP
        END.
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